What is claimed is:

10

1. A communication system for efficiently transmitting information signals that were formatted in variable sized packets of more than a minimum size by using time division transmission of packet segments and allocating available bandwidth on demand, said system comprising:

a satellite/wireless network;

at least two sites, each comprising a plurality of terminals operative to transmit and receive signals via said satellite/wireless network and a local area network for interconnecting said terminals at a common site, each said terminals comprising:

- (a) a modem for transmitting signals from a terminalon predetermined channels having a predetermined15 bandwidth;
 - (b) means for time dividing data signals input to said terminal from an external location and for assembling said time divided data signals as bursts within repeated frames, each frame having a unique frame header;
- in variable sized packets into a plurality of segments;

- for combining each segment plurality of segments with a unique segment and reassembly
- header to form a SAR segment;

(d)

5

- for 25 means combining said SAR segments representing a single packet with a unique frame header to form a SAR frame; and
- means for selectively appending a terminal ID header to each said SAR frame for transmission in a burst from a modem. 30
 - The communication system as set forth in claim 1 2. wherein each terminal further comprises:
 - means for detecting said SAR frame and for (q) dividing said SAR frame into SAR segments;
 - means for rearranging the segments in said SAR (h) segments on the basis of said SAR header; and
 - (i) means for reassembling said packets on the basis of said rearranged segments.
 - The communication system as set forth in claim 2 З. further comprising means for receiving a SAR frame-on the basis of said terminal ID information.
 - The communication system as set forth in claim 2 4. wherein said SAR frame comprises information defining the length of said plurality of SAR representing a single packet.

WO 99/04521 PCT/US98/14194 57

- 5. The communication system as set forth in claim 2 wherein said SAR segment comprises at least a signal identifying the packet sequence number for said segment.
- 6. The communication system as set forth in claim 2 wherein said SAR segment comprises at least a signal identifying a SAR id of such header.
- 7. The communication system as set forth in claim 2 wherein said SAR segment comprises at least a signal indicating whether a given segment is first or last among said plurality of segments defining a variable size packet.
- 8. The communication system as set forth in claim 2 wherein said SAR segment comprises at least a signal identifying at least one receiving modem for said packet.
- 9. The communication system as set forth in claim 2 wherein said terminal ID header comprises at least one of control group, site and unit information.
- 10. The communication system as set forth in claim 2 wherein said SAR header comprises one byte having identification information about a sending terminal and a receiving terminal.
- 11. The communication system as set forth in claim
 10 wherein said SAR segment is for point to point bursts
 between sites having only one terminal each.

WO 99/04521 PCT/US98/14194 58

- 12. The communication system as set forth in claim 1 further comprising means for detecting the needed bandwidth for transmitting information signals and for allocating segments of a single packet to respective ones of multiple modems.
- 13. The communication system as set forth in claim 2 further comprising a central network controller for assigning bandwidth among plural modems on a per packet basis.
- 14. The communication system as set forth in claim 2 further comprising a controller distributed among plural modems for assigning bandwidth among plural modes on a per packet basis.
- 15. The communication system as set forth in claim 2 further comprising means for filling a SAR segment with fill data when said packet does not have sufficient data to completely fill a segment.
- 16. The communication system as set forth in claim 2 wherein said SAR segment has a uniform size data content.
- 17. The communication system as set forth in claim
 16 wherein said size is identical to the size of an ATM
 cell.

- The method of transmitting information arranged
- in packets from one location to a second location via a wireless/satellite network, comprising:
- (a) examining each packet to determine whether its5 size is equal to a minimum;
 - (b) if a minimum size, generating a first SAR header and applying said header to said packet to form a SAR segment;
- (c) if greater than a minimum size, dividing said

 packet into a plurality of segments having a uniform size,

 generating a second SAR header that is unique for each

 segment and applying said header to a respective one of

 said segments to form SAR segments:
- (d) forwarding said SAR segments to one or more

 15 modems for transmission to at least one terminal at said second location.
 - 19. The method of transmitting information as set forth in claim 18 further comprising:
 - (e) sorting said SAR segments by at least one of carrier id, burst position in frame and channel in burst;
 - 5 (f) sending said SAR segments to a predetermined modem;
 - (g) determining whether the source and destination ID for segments and bursts are identical: and

- (h) on the basis of the identity of the unit, site 10 and control group, generating burst and identity information for transmission to said second site.
 - 20. A communication method as set forth in claim 19, wherein said packets comprise ATM cells.
 - 21. A communication method as set forth in claim 19, wherein said packets comprise frame relay packets.
 - 22. A communication method as set forth in claim 19, wherein said packets comprise at least one of ATM cells and frame relay packets.
 - 23. A segmentation and reassembly cell comprising a segment of a packet and a header comprising at least a packet sequence number for uniquely identifying a packet to which said segment relates, a SAR id for uniquely identifying the segment among all segments derived from the packet, and a destination id for uniquely identifying the destination for the packet.
 - 24. A segmentation and reassembly cell as set forth in claim 23 further comprising a first and last segment indicator.
 - 25. A communication method for reassembling segments transmitted by a satellite/wireless network in a time divided manner by discrete bursts that identify the

terminals by at least one of unit, site and control group, comprising:

5

selecting a modem and receiving a burst at said selected modem on the basis of common addresses in said burst;

sorting segments within burst received by said modem
to restore the original order of the segments prior to transmission;

resequencing said sorted segments in a queue at a selected one of a plurality of locations on the basis of a burst slot and key; and

combining said segments at each of said plurality of locations to reassemble a packet.

- 26. The method as set forth in claim 25 wherein said resequencing step comprises computing a burst slot and composing a key for arranging said segments into a queue.
- 27. The method as set forth in claim 25 wherein segments received in bursts are processed in the order received in the burst.